

SESSION TOPIC: Simulation, Models and Wargame as Tools for
Missile Defense Analysis

TITLE: “COOKBOOK” EVALUATION OF BALLISTIC MISSILE
DEFENSE KILL VEHICLE PERFORMANCE

TEXT:

We have incorporated the results of high fidelity simulations into easy to use “cookbook” codes which we have subsequently used to evaluate interceptor and kill vehicle (KV) requirements and performance based on proposed ballistic missile defense (BMD) architectures. We use a linked family of codes to evaluate interceptor performance. Footprinting codes generate possible intercepts, flight timelines, and initial conditions for detailed 6DOF interceptor simulations. External detailed models provide space and ground based sensor tracking performance. The 6DOF simulation is run repeatedly with monte carlo simulation of relevant error sources and results are evaluated by simplified lethality codes. We evaluate the simulation results statistically and determine statistical predictors of performance parameters such as miss distance and divert requirements based on KV design characteristics and engagement characteristics such as geometry, timeline, or aerothermal environment. We incorporate these predictors of performance into a MATLAB “cookbook” which allows investigation of the impact of architecture components on KV performance to be assessed quickly and easily via a graphical user interface. We present as an example the evaluation of possible space and ground based sensor data which may be considered for use for interceptor commit or inflight updates for both theater and national missile defense systems. By incorporating previously developed “cookbooks” to calculate space and ground based sensor tracking it appears possible to evaluate BMD system performance with the fidelity of many days of computer simulation by using a simple PC based “cookbook” with a simple graphical input interface.

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